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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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FOLEY AND LARDNER
SUITE 500
3000 K STREET NW
WASHINGTON, DC 20007

EXAMINER
GIBBS, TERRA C

ART UNIT	PAPER NUMBER
1635	

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/715,036	DODO ET AL.	
	Examiner	Art Unit	
	Terra C. Gibbs	1635	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 March 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *21-26* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *16* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

This Office Action is a reply to the Amendment filed March 6, 2003 in Paper No. 15.

New claims 22-26 are acknowledged.

Claims 1-26 are pending in the instant application.

Claims 1-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 12.

This application contains claims 1-20 drawn to an invention nonelected with traverse in Paper No. 12. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claims 21-26 are under consideration.

Information Disclosure Statement

The Information Disclosure Statement, filed March 6, 2003 in Paper No. 16 supplying references A17-A97, previously submitted September 18, 2001 is acknowledged.

Priority

The Amendment to the Specification to include the priority information in the first line of the Specification is acknowledged.

Response to Amendment

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The 35 U.S.C. 112, first paragraph rejection against claim 21 is withdrawn in view of Applicant's arguments.

The 35 U.S.C. 103(a) rejection against claim 21 as being unpatentable over Tada et al. (FEBS Letters, 1996 Vol. 391:341-345) in further view of Kleber-Janke et al. (Allergy and Immunology, 1999 Vol. 119:265-274) and Shewry et al. (Journal of Chromatography, 2001 Vol. 756:327-335) is maintained for the reasons of record set forth in the previous Office Action mailed November 6, 2002 in Paper No. 13.

Applicants argue that the 103(a) rejection is flawed because the Examiner has failed to establish a *prima facie* case of obviousness. Applicants argue that Tada et al. teach a method for antisense suppression of a 16 kDa allergen in rice seeds by operably linking a fragment of the cDNA encoding the rice allergen in the antisense orientation and cloning the fusion construct into a vector for rice transformation. Applicants argue that Tada et al. demonstrate that antisense RNA markedly reduced the mRNA and protein content of the rice allergen in transgenic rice seed. Applicants further argue that the Examiner has misstated that Tada et al. teaches that the antisense approach could be used in other crop plants containing known allergens such as peanuts and soybeans. Applicants further argue that Tada et al. do not teach the *Ara* h gene or methods of identifying a homologous region common to more than one *Ara* h gene. Applicants

also argue that Kleber-Janke et al. teaches the isolation and characterization of IgE-binding proteins of peanuts. Applicants further argue that Kleber-Janke discloses the amino acid homology between *Ara* h2, *Ara* h6, and *Ara* h7, but do not teach the amino acid homology between *Ara* h1, *Ara* h2, *Ara* h3, *Ara* h4, *Ara* h5, *Ara* h6 and *Ara* h7. Applicants further argue that Kleber-Janke do not teach or suggest operably linking the homologous region in the antisense orientation to a promoter, cloning the promoter-gene construct in a vector modified for peanut transformation, transforming a recipient peanut cell with the vector, and identifying and selecting fertile peanut plants that produce seeds with reduced or undetectable allergen protein content.

Applicant's arguments have been fully considered, but are not found persuasive. Applicants argue against the references individually, but must consider the rejection based upon the combination of the references. *See*, MPEP 2145. As stated in the previous Office Action and as stated by Applicant's arguments, Tada et al. teach a method for antisense suppression of a 16 kDa allergen in rice seeds by operably linking a fragment of the cDNA encoding the rice allergen in the antisense orientation and cloning the fusion construct into a vector for rice transformation. While Applicant points out that the Examiner has misstated that Tada et al. teaches that the antisense approach could be used in other crop plants containing known allergens such as peanuts and soybeans, it is noted that Tada et al. disclose, "Antisense RNA with a complementary sequence of mRNA has been used experimentally to inhibit gene expression in bacteria, yeast, plant and animal cells and the antisense strategy has also been reported to be practically applicable to transgenic crop plants" (see page 341, first column last line and second column, first 4 lines). Therefore, and as stated in the previous Office Action, it would have been

obvious to one of ordinary skill in the art to devise a method for producing a transgenic peanut plant with reduced or undetectable allergen protein content in the seed using the method of Tada et al. As stated in the previous Office Action, since Tada et al. teach antisense methodologies in a rice plant, it would have been obvious to one of ordinary skill in the art to substitute the rice plant with a peanut plant since Tada et al. taught the antisense approach could be used on other crops. As stated in the previous Office Action, it would have been obvious to one of ordinary skill in the art to reduce the *Ara* h allergen gene in a peanut plant since the art has asserted that the *Ara* h gene family are major dietary allergens in peanut grain. As stated in the previous Office Action, one of ordinary skill in the art would have expected to be successful in identifying a homologous region common to more than one *Ara* h allergen gene since the prior art explicitly taught such techniques by aligning the deduced amino acid sequences of several *Ara* h genes (Kleber-Janke et al.). It is noted that the instant specification does not define or describe any more than the cited art. It is reiterated that Kleber-Janke et al. identify several homologous regions common between *Ara* h2, *Ara* h6 and *Ara* h7 (see Figure 3). While Kleber-Janke et al. do not teach the amino acid homology between all *Ara* h genes, based on its teachings, an artisan would have been able to determine homologous regions among any *Ara* h gene. Additionally, it is noted that the instant specification only requires identifying a homologous region common to more than one *Ara* h allergen gene. Therefore, using the combined methods of Tada et al. and Kleber-Janke et al., one of ordinary skill would have been motivated and expected success in devising a method for producing a transgenic peanut plant with reduced or undetectable allergen protein content in the seed.

The invention as a whole would therefore have been obvious to one of ordinary skill in the art at the time the invention was made.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 21, 22, 23, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tada et al. (FEBS Letters, 1996 Vol. 391:341-345) in view of Kleber-Janke et al. (Allergy and Immunology, 1999 Vol. 119:265-274) and Lacorte et al. (Plant Cell Reports, 1991 Vol. 10:354-357).

Claims 21, 22, 23, 25 and 26 are drawn to a method for producing a transgenic peanut plant with reduced or undetectable allergen protein content in the seed, comprising identifying a homologous region common to more than one *Ara* h allergen gene; cloning the homologous region in a vector modified for peanut transformation; transforming a recipient peanut plant cell with the vector; and identifying a transgenic plant that produces seeds having reduced or undetectable allergen protein content. Claims 22, 23, 25 and 26 are dependent on claim 21 and

include all the limitations of claim 21, wherein said *Ara* h allergen gene is selected from the group consisting of *Ara* h1, *Ara* h2, *Ara* h3, *Ara* h4, *Ara* h5, *Ara* h6 and *Ara* h7; wherein said recipient peanut cell is transformed by *Agrobacterium*-mediated method of transformation; wherein said promoter is selected from the group consisting of constitutive, inducible, and tissue-preferred and wherein said promoter is a seed-preferred promoter.

Tada et al. teach a cloned gene encoding the 16-kDa allergenic protein from rice was operably linked to a promoter, cloned in a vector and transformed by electroporation in rice seeds (see page 341, second column). Tada et al. further teach the level of the 16-kDa protein was significantly reduced in the rice seed in a number of the progeny, however, the protein was not completely eliminated in these plants (see Figures 3 and 4). Tada et al. further teach that this approach could be used in other crops containing known allergens (see page 341, second column). Tada et al. further teach constitutive and seed-preferred promoters were used to for antisense gene expression in rice plants (see page 391, second column and page 344, second to last paragraph).

Tada et al. do not teach identifying a homologous region common to more than one *Ara* h allergen gene or peanut transformation using the *Agrobacterium*-mediated method of transformation.

Kleber-Janke et al. teach the alignment of the deduced amino acid sequences of *Ara* h2, h6, and h7 shows the identical regions of theses three members of the *Ara* h gene family (see Figure 3).

Lacorte et al. teach gene transfer into peanut plants via *Agrobacterium tumefaciens* is an efficient way to introduce desirable traits into crop plants (see Figure 4).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to modify the method of Tada et al. to produce a transgenic peanut plant with reduced or undetectable allergen protein content in the seed with a reasonable expectation of success since Tada et al. taught the production of transgenic rice plants with a reduced 16-kDa allergen protein in the seed.

One of ordinary skill would have been motivated to substitute the transgenic rice plant with a transgenic peanut plant since Tada et al. taught the approach could be used on other crops. One of ordinary skill in the art would have been motivated to substitute the 16-kDa allergen protein with an *Ara* h allergen gene because the art taught that both genes are major dietary allergens in rice grain and peanut grain, respectively (Shewry et al.).

It would have been obvious to one of ordinary skill in the art to identify a homologous region common to more than one *Ara* h allergen gene because Kleber-Janke et al. taught the identity of similarities between allergens can determine the frequency recognition of IgE serum binding in peanut-sensitive patients. One of ordinary skill in the art would have expected to be successful in identifying a homologous region common to more than one *Ara* h allergen gene since the prior art explicitly taught such techniques by aligning the deduced amino acid sequences (Kleber-Janke et al.). Additionally, it would have been obvious to one of ordinary skill in the art to identify the homologous region, link it to a promoter and clone it into a vector since Shewry et al. taught such methods could silence endogenous genes in plants. One of ordinary skill in the art would have expected to be successful in cloning the promoter-linked homologous region in a vector and transforming a cell with that vector since Tada et al. taught such methods would successfully reduce allergen protein content in seeds. One of ordinary skill

in the art would have expected success in the transforming the peanut using the *Agrobacterium*-mediated method of transformation since Lacorte et al. taught gene transfer into peanut plants via *Agrobacterium tumefaciens* is an efficient way to introduce desirable traits into crop plants.

The invention as a whole would therefore have been obvious to one of ordinary skill in the art at the time the invention was made.

Claims 21, 22, 24, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tada et al. (FEBS Letters, 1996 Vol. 391:341-345) and Kleber-Janke et al. (Allergy and Immunology, 1999 Vol. 119:265-274) as applied to claims 21, 22, 23, 25 and 26 above and further view of Klein et al. (Nature, 1987 Vol. 327:70-73).

Claims 21, 22, 24, 25 and 26 are described in the 103(a) rejection against claims 21, 22, 23, 25 and 26 on page 6. Claim 24 is dependent on claim 21 and includes all the limitations of claim 21, wherein said recipient peanut cell is transformed by the biolistic method.

Tada et al. and Kleber-Janke et al. are relied upon as cited in the 103(a) rejection against claims 21, 22, 23, 25 and 26 on page 6.

Tada et al. do not teach peanut transformation using the biolistic method of transformation.

Klein teach introducing nucleic acids into a plant cell using high velocity biolistic penetration by small particles is an alternative approach to the restricted *Agrobacterium tumefaciens* transformation method (see Table 1).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to modify the method of Tada et al. to produce a transgenic peanut plant with

reduced or undetectable allergen protein content in the seed with a reasonable expectation of success since Tada et al. taught the production of transgenic rice plants with a reduced 16-kDa allergen protein in the seed.

One of ordinary skill would have been motivated to substitute the transgenic rice plant with a transgenic peanut plant since Tada et al. taught the approach could be used on other crops. One of ordinary skill in the art would have been motivated to substitute the 16-kDa allergen protein with an *Ara* h allergen gene because the art taught that both genes are major dietary allergens in rice grain and peanut grain, respectively (Shewry et al.).

It would have been obvious to one of ordinary skill in the art to identify a homologous region common to more than one *Ara* h allergen gene because Kleber-Janke et al. taught the identity of similarities between allergens can determine the frequency recognition of IgE serum binding in peanut-sensitive patients. One of ordinary skill in the art would have expected to be successful in identifying a homologous region common to more than one *Ara* h allergen gene since the prior art explicitly taught such techniques by aligning the deduced amino acid sequences (Kleber-Janke et al.). Additionally, it would have been obvious to one of ordinary skill in the art to identify the homologous region, link it to a promoter and clone it into a vector since Shewry et al. taught such methods could silence endogenous genes in plants. One of ordinary skill in the art would have expected to be successful in cloning the promoter-linked homologous region in a vector and transforming a cell with that vector since Tada et al. taught such methods would successfully reduce allergen protein content in seeds. One of ordinary skill in the art would have expected success in the transforming the peanut using high velocity biolistic method of transformation since Klein et al. taught gene transfer into peanut plants via

the high velocity biolistic method is an alternative approach to introduce desirable traits into crop plants.

The invention as a whole would therefore have been obvious to one of ordinary skill in the art at the time the invention was made.

Conclusion

No claims are allowable.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terra C. Gibbs whose telephone number is (703) 306-3221. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John L. LeGuyader can be reached on (703) 308-0447. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-8693 for regular communications and (703) 872-9307 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

tcg
May 28, 2003